National Coal Council
2017 Annual Fall Meeting
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Birmingham, AL

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Global Energy Institute
U.S. Chamber of Commerce
Coal-Relevant Issues to Watch
1. Gas Prices

**Coal-natural gas price spreads have grown in influence**

Every $0.10/mmBtu change in natural gas moves +/- 4.5 million tons of Eastern coal and 8.6 million tons of PRB coal.

Source: S&P Global
## 1b. Economic Growth

- Headline finding of 2017 EIA IEO is lowered coal projections...

### Coal consumption projections - IEO 2013 vs. IEO 2017 (quadrillion Btu)

<table>
<thead>
<tr>
<th>Year</th>
<th>U.S.</th>
<th>China</th>
<th>India</th>
<th>Global</th>
</tr>
</thead>
<tbody>
<tr>
<td>IEO 2017</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2013</td>
<td>122.7</td>
<td>141.3</td>
<td>68.3</td>
<td>210.5</td>
</tr>
<tr>
<td>2015</td>
<td>121.5</td>
<td>141.3</td>
<td>68.3</td>
<td>210.5</td>
</tr>
</tbody>
</table>

- but primary driver of decreased electricity (and coal) demand between 2013 and 2017 International Energy Outlook is **reduced global economic growth** (3.6% annualized vs. 2.8% in 2017).
1b. Economic Growth

- EIA Reference Case annual U.S. GDP growth of 2.2% results in 0.4% annual electricity demand growth.

- High Economic Growth Case U.S. GDP growth of 2.6% results in 0.6% annual electricity demand growth.

- In 2030, this modestly higher growth results in 81 billion kWh more demand—2 percent of national demand.
2. Grid Management Policies

- Market distortions gradually pressuring traditional baseload resources.

- Reliability not immediate concern, but **resiliency** risks from disruptive events grow as grid diversity is reduced.

- Improved price formation, “essential reliability services” may help address.

$50k Q: What if anything will FERC and/or states do to address issue?
AMERICA NEEDS TO KEEP ITS DIVERSE ENERGY MIX

Today, America’s diverse energy resources are providing abundant, reliable and affordable electricity that is critical to our economy and national security.

But that is at risk, thanks to subsidies, mandates and market conditions which are jeopardizing some of America’s most reliable and resilient electricity resources. A new study we sponsored conducted by IHS Markit, a respected research firm, quantifies just how important maintaining all of America’s electricity resources—coal, natural gas, nuclear and renewables—is for our economy.

The U.S. Department of Energy found that a diverse set of resources is vital for our security and our economic future, and to keeping the lights on 24/7. Thanks to this new IHS Markit study, we can now see the employment and economic costs of abandoning our diverse electricity mix.

Our current energy mix, including significant contributions from nuclear and coal, is saving us $114 billion per year in electricity costs – lowering the average retail price by 27 percent. Without this diverse, balanced electricity portfolio, prices could go up. These higher prices would lead to:

- **A loss of 1 million jobs within 3 years**
- **A loss of $158 billion to our nation’s economy (GDP) within 3 years**
- **A loss of up to $845 in income for every U.S. household per year.**
Meanwhile, Down Under…

FINANCIAL REVIEW

But the government all-but confirmed on Tuesday that it had moved away from plans to implement a CET and will instead unveil a policy which places a heavier emphasis on cheap and reliable power.

Energy Minister Josh Frydenberg said last week’s report by the Australian Energy Market Operator which highlighted an intermediate-term shortfall in baseload power if Liddell closed in 2022 had "reset the debate" and "placed a focus and a premium" on baseload and stability.

Mr Turnbull told Parliament "the real challenge to the reliability of the energy system is the failure of the current market system to take into account the importance of having baseload power".

"We need to ensure that the energy market design provides a suitable framework for investment that doesn't simply get new generation, but gets generation of the right kind," he said.

"Because you have to keep the lights on, and you have to ensure that people can afford to pay to keep the lights on."

Mr Turnbull insisted there could be a policy which kept coal burning longer but still enabled Australia to meet its 2030 emissions reductions targets.
3. Subsidies/Mandates

- PTC/ITC/RPS/EERS/PURPA/NET METERING/ETC
- AWEA projects **45 GW new wind capacity** coming online between 2017-2023)
4. New 111(d) Guidelines

- Formal CPP Repeal Proposal expected early October.
- Revised 111(d) guidelines likely emphasize inside-the-fence, state-driven, facility-focused flexible standards.
- CAA requirement to consider remaining useful life will be followed.
- Timeline an important factor.
5. New 111(b) Guidelines

- 111(b) lawsuit currently in indefinite abeyance.

- Status of Kemper, Boundary Dam facilities illustrate need to revisit EPA’s “adequately demonstrated” claims.

- New BSER likely to take cost, achievability, practical issues into account.

- Formal repeal and reconsideration of 111(b) rule likely to lag 111(d), though finalization may be concurrent.
6. New Source Review Reform

- Restrictive interpretation of NSR perversely discourages efficiency + operational improvements.

- Combination of administrative and statutory reforms necessary—focus on clarifying “major modification” and “routine maintenance.”

- May be addressed as part of CPP reconsideration.

**Average Age of Coal Fleet by State**

7. Coal Exports

U.S. coal exports by port, 2016

<table>
<thead>
<tr>
<th>Port</th>
<th>million short tons</th>
<th>2016 exports and utilization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atlantic Coast total</td>
<td></td>
<td>32%</td>
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<tr>
<td>Norfolk</td>
<td></td>
<td></td>
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<tr>
<td>Baltimore</td>
<td></td>
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<tr>
<td>other Atlantic Coast ports</td>
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<tr>
<td>Gulf Coast total</td>
<td></td>
<td>13%</td>
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<tr>
<td>New Orleans</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mobile</td>
<td></td>
<td></td>
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<tr>
<td>other Gulf Coast ports</td>
<td></td>
<td></td>
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<tr>
<td>Great Lakes</td>
<td></td>
<td>17%</td>
</tr>
<tr>
<td>West Coast</td>
<td></td>
<td>17%</td>
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<tr>
<td>overland exports</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: U.S. Energy Information Administration, Quarterly Coal Report and various trade press reports and company press releases
Note: West Coast includes coal exported from Alaska.
Coal-fired Power Plants Planned and Under Construction

Total installed capacity (megawatts)

- China: 460,264
- India: 360,935
- Indonesia: 48,407
- Vietnam: 48,118

Total Global Proposed Builds: 1,167,114*

Source: Platts database, September 2015
Note: 28 countries planning to build new capacity of 1,000 MW or less are not shown

* Exergyxxi.org
8. Retrospective Reg Reform

Recently Finalized Regulations Impacting Coal:

<table>
<thead>
<tr>
<th>New Rule/Regulation</th>
<th>Agency/Issuer</th>
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<tbody>
<tr>
<td>Stream Protection Rule</td>
<td>Interior</td>
</tr>
<tr>
<td>NEPA Guidance</td>
<td>White House</td>
</tr>
<tr>
<td>CO2 Regulations for New Power Plants (NSPS)</td>
<td>EPA</td>
</tr>
<tr>
<td>CO2 Regulations for Existing Power Plants (ESPS)</td>
<td>EPA</td>
</tr>
<tr>
<td>Ozone Guidance</td>
<td>EPA</td>
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<tr>
<td>&quot;Waters of the U.S.&quot;</td>
<td>EPA</td>
</tr>
<tr>
<td>Coal Combustion Residuals</td>
<td>EPA</td>
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<tr>
<td>International financing</td>
<td>Treasury</td>
</tr>
<tr>
<td>Startup, Shutdown, Malfunction</td>
<td>EPA</td>
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<tr>
<td>Regional Haze</td>
<td>EPA</td>
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<tr>
<td>Cross State Air Pollution Rule (CSAPR) Updates</td>
<td>EPA</td>
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<tr>
<td>Mineral Valuation</td>
<td>DOI-ONNR</td>
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<tr>
<td>Coal Lease Moratorium</td>
<td>Interior</td>
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<tr>
<td>ESA Designations</td>
<td>Interior</td>
</tr>
<tr>
<td>Monument Designations</td>
<td>POTUS</td>
</tr>
<tr>
<td>MATS Supplemental Findings</td>
<td>EPA</td>
</tr>
<tr>
<td>Power Plant ELGs</td>
<td>EPA</td>
</tr>
</tbody>
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8. Prospective Reg Reform

- Energy legislation of any kind seems unlikely
- Great need for administrative/process reforms at EPA:
  - Restoration of cooperative federalism
  - Enhanced public participation, especially with small business
  - Cost-Benefit Accounting
  - Use of non-public scientific and technical data in regulations
  - Whole economy modeling
  - Black box modeling
  - Regulatory science reforms
- NEPA guidance and other permitting relief possible
9. NEPA and “Downstream GHGs”

- **August 2016**: Obama White House releases NEPA GHG Guidance.
- **March 2017**: Trump White House rescinds NEPA GHG Guidance.
- **August 2017**: D.C. Circuit remands FERC pipeline EIS for failure to consider downstream greenhouse-gas emissions.
- **September 2017**: 10th Circuit (Denver) remands BLM coal lease EIS for similar reasons.
- Divergent agency approaches and court views likely to force clarifications *somewhere*. 
California’s post-2020 cap-and-trade law sets forth most stringent carbon restrictions in the world. State must cut economy-wide emissions 40% (182 mmt) by 2030. Optimistic reductions for electric (40 mmt) and transportation (70 mmt) still leave large shortfall. Success or failure of CA cap-and-trade in early 2020s will greatly influence national CO2 debate.
Clearing the Air on Cleaning the Air
Economic Growth + Environmental Progress

Source: EPA
Not Your Father’s Coal Plants

Coal Generation
+ 123%

GDP per Capita
+ 118%

Regulated Emissions/MWh from Coal
- 90%

Figure 5: Emissions of Sulfur Dioxide and Nitrogen Oxides per Unit of Electricity Generated by Fossil Fuel Generating Units in 2010, by Decade Unit Began Operating

<table>
<thead>
<tr>
<th>Age of unit (decade unit began operating)</th>
<th>Sulfur dioxide emissions rate</th>
<th>Nitrogen oxides emissions rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1950s</td>
<td>11.6</td>
<td>2.8</td>
</tr>
<tr>
<td>1960s</td>
<td>7.8</td>
<td>2.5</td>
</tr>
<tr>
<td>1970s</td>
<td>3.9</td>
<td>1.8</td>
</tr>
<tr>
<td>1980s</td>
<td>3.8</td>
<td>2.0</td>
</tr>
<tr>
<td>1990s</td>
<td>0.9</td>
<td>0.1</td>
</tr>
<tr>
<td>2000s</td>
<td>0.1</td>
<td>0.1</td>
</tr>
</tbody>
</table>

Source: GAO analysis of Vertyx data.
Average Urban PM2.5 Concentrations

EPA Standard/Safe Level: 12

Data source: World Health Organization
Comparison of PM 2.5 Air Quality Levels in Major Global Cities

EPA Standard/Safe Level: 12

Data source: World Health Organization